

CPC**COOPERATIVE PATENT CLASSIFICATION****B21J****FORGING
HAMMERING
PRESSING
RIVETING**

FORGE FURNACES (rolling of metal [B21B](#) ; making particular products by forging or pressing [B21K](#) ; cladding or plating [B23K](#) ; finishing surfaces by hammering [B23P 9/04](#); compacting surfaces by blasting with particulate material [B24C 1/10](#); general features of presses, presses for consolidating scrap [B30B](#) ; furnace in general [F27](#))

Guide heading:

- B21J 1/00** **Preparing metal stock** { or similar ancillary operations prior, during or post forging, e.g. heating or cooling (pretreatment for rolling [B21B 1/02](#), [B21B 15/0035](#)) }
- [B21J 1/003](#) . { Selecting material }
- [B21J 1/006](#) . . { Amorphous metal }
- [B21J 1/02](#) . Preliminary treatment of metal stock without particular shaping, e.g. salvaging segregated zones, forging or pressing in the rough (modifying the physical properties by deformation [C21D 7/00](#), [C22F 1/00](#))
- [B21J 1/025](#) . . { affecting grain orientation }
- [B21J 1/04](#) . Shaping in the rough solely by forging or pressing
- [B21J 1/06](#) . Heating or cooling methods or arrangements specially adapted for performing forging or pressing operations { ([B21J 5/063](#) takes precedence) }
- B21J 3/00** **Lubricating during forging or pressing** (lubricating in general [F16N](#))
- B21J 5/00** **Methods for forging, hammering, or pressing** (for working sheet-metal or metal tubes, rods, or profiles [B21D](#) ; for working wire [B21F](#))
Special equipment or accessories therefor
- [B21J 5/002](#) . { Hybrid process, e.g. forging following casting }
- [B21J 5/004](#) . { Thixotropic process, i.e. forging at semi-solid state }
- [B21J 5/006](#) . { using ultrasonic waves }
- [B21J 5/008](#) . { Incremental forging }
- [B21J 5/02](#) . Die forging
Trimming by making use of special dies; { Punching during forging }
- [B21J 5/022](#) . . { Open die forging }

- B21J 5/025 .. { Closed die forging }
- B21J 5/027 .. { Trimming }
- B21J 5/04 . by directly applied fluid pressure or explosive action
- B21J 5/06 . for performing particular operations
- B21J 5/063 .. { Friction heat forging (friction heat riveting [B21J 15/027](#)) }
- B21J 5/066 ... { Flow drilling }
- B21J 5/08 .. Upsetting
- B21J 5/10 .. Piercing billets (in combination with extrusion [B21C 23/00](#))
- B21J 5/12 .. Forming profiles on internal or external surfaces (making screw-thread by forging, pressing, or hammering [B21K](#))
- B21J 7/00** **Hammers**
Forging machines with hammers or die jaws acting by impact (hand hammers [B25D](#) ; electrical features in section H)
- B21J 7/02 . Special design or construction
- B21J 7/04 .. Power hammers
- B21J 7/06 .. Drop hammers
- B21J 7/08 ... with rigidly-guided hammer
- B21J 7/10 .. with both drive and hammer connected to a fulcrumed lever, e.g. tail hammers
- B21J 7/12 ... the lever being a spring, i.e. spring hammers
- B21J 7/14 .. Forging machines working with several hammers
- B21J 7/145 ... {the hammers being driven by a rotating annular driving member }
- B21J 7/16 ... in rotary arrangements
- B21J 7/18 .. Forging machines working with die jaws, e.g. pivoted, movable laterally of the forging or pressing direction e.g. for swaging
- B21J 7/20 . Drives for hammers
Transmission means therefor
- B21J 7/22 .. for power hammers
- B21J 7/24 ... operated by steam, air, or other gaseous pressure
- B21J 7/26 operated by internal combustion
- B21J 7/28 ... operated by hydraulic or liquid pressure
- B21J 7/30 ... operated by electro-magnets
- B21J 7/32 ... operated by rotary drive, e.g. by electric motor
- B21J 7/34 ... operating both the hammer and the anvil, so-called counter-tup
- B21J 7/36 .. for drop hammers
- B21J 7/38 ... driven by steam, air, or other gaseous pressure
- B21J 7/40 ... driven by hydraulic or liquid pressure
- B21J 7/42 ... operated by rotary drive, e.g. electric motors
- B21J 7/44 equipped with belts, ropes, cables, chains
- B21J 7/46 .. Control devices specially adapted to forging hammers, not restricted to one of the preceding sub-groups

B21J 9/00**Forging presses**

- B21J 9/02 . Special design or construction
- B21J 9/022 .. {multi-stage forging presses (handling devices [B21K 27/00](#)) }
- B21J 9/025 .. {with rolling or wobbling dies }
- B21J 9/027 .. { with punches moving along auxiliary lateral directions ([B21J 13/025](#) takes precedence) }
- B21J 9/04 .. Piercing presses
- B21J 9/06 .. Swaging presses
Upsetting presses
- B21J 9/08 ... equipped with devices for heating the work-piece ([electric heating elements H05B](#))
- B21J 9/10 . Drives for forging presses
- B21J 9/12 .. operated by hydraulic or liquid pressure
- B21J 9/14 ... in conjunction with electric power
- B21J 9/16 ... in conjunction with steam or gas power
- B21J 9/18 .. operated by making use of gearing mechanisms, e.g. levers, spindles, crankshafts, eccentrics, toggle-levers, rack bars
- B21J 9/20 .. Control devices specially adapted to forging presses not restricted to one of the preceding sub-groups

B21J 11/00**Forging hammers combined with forging presses
Forging machines with provision for hammering and pressing****B21J 13/00****Details of machines for forging, pressing, or hammering**

- B21J 13/02 . Dies or mountings therefor
- B21J 13/025 .. { Dies with parts moving along auxiliary lateral directions }
- B21J 13/03 .. Die mountings
- B21J 13/04 . Frames
Guides
- B21J 13/06 . Hammers tups
Anvils
Anvil blocks
- B21J 13/08 . Accessories for handling work or tools
- B21J 13/085 .. {handling of tools }
- B21J 13/10 .. Manipulators ([in general B25J](#))
- B21J 13/12 ... Turning means
- B21J 13/14 .. Ejecting devices

B21J 15/00**Riveting**

- B21J 15/02 . Riveting procedures
- B21J 15/022 .. {Setting rivets by means of swaged-on locking collars, e.g. lockbolts }
- B21J 15/025 .. {Setting self-piercing rivets }
- B21J 15/027 .. { Setting rivets by friction heating }
- B21J 15/04 .. Riveting hollow rivets mechanically
- B21J 15/041 ... { by pushing a drive-pin }
- B21J 15/043 ... { by pulling a mandrel }
- B21J 15/045 { and swaging locking means, i.e. locking the broken off mandrel head to the hollow rivet }
- B21J 15/046 ... {by edge-curling }
- B21J 15/048 ... { Setting self-drilling hollow rivets }
- B21J 15/06 .. { Riveting hollow rivets by means of hydraulic, liquid, or gas pressure (portable riveters [B21J 15/105](#)) }
- B21J 15/08 .. riveting by applying heat { , e.g. } to the end parts of the rivets to enable heads to be formed { ([B21J 15/027](#) takes precedence) }
- B21J 15/10 . Riveting machines (electric heating elements [H05B](#))
- B21J 15/105 .. { Portable riveters (pliers for riveting [B21J 15/386](#)) }
- B21J 15/12 .. with tools or tool parts having a movement additional to the feed movement, e.g. spin { ([B21J 15/027](#) takes precedence) }
- B21J 15/14 .. specially adapted for riveting specific articles, e.g. brake lining machines
- B21J 15/142 ... { Aerospace structures }
- B21J 15/145 ... { Turbines }
- B21J 15/147 ... { Composite articles }
- B21J 15/16 .. Drives for riveting machines
Transmission means therefor
- B21J 15/18 ... operated by air pressure or other gas pressure, e.g. explosion pressure
- B21J 15/185 {by explosion pressure }
- B21J 15/20 ... operated by hydraulic or liquid pressure
- B21J 15/205 {Riveting tools having hand operated pumps for building up the hydraulic pressure }
- B21J 15/22 ... operated by both hydraulic or liquid pressure and gas pressure
- B21J 15/24 ... operated by electro-magnets
- B21J 15/26 ... operated by rotary drive, e.g. by electric motor
- B21J 15/28 .. Control devices specially adapted to riveting machines not restricted to one of the preceding sub-groups
- B21J 15/285 ... { for controlling the rivet upset cycle }
- B21J 15/30 .. Particular elements, e.g. supports
Suspension equipment specially adapted for portable riveters
- B21J 15/32 ... Devices for inserting or holding rivets in position with or without feeding arrangements
- B21J 15/323 { using a carrier strip }
- B21J 15/326 { Broken-off mandrel collection }
- B21J 15/34 for installing { multiple-type } tubular rivets

- B21J 15/36
 - .. Rivet sets, i.e. tools for forming heads
 - Mandrels for expanding parts of hollow rivets
- B21J 15/365
 - ... {Mandrels for expanding parts of hollow rivets }
- B21J 15/38
 - . Accessories for use in connection with riveting, e.g. pliers for upsetting
 - Hand tools for riveting
- B21J 15/383
 - .. { Hand tools for riveting }
- B21J 15/386
 - .. { Pliers for riveting }
- B21J 15/40
 - .. for forming rivet heads
- B21J 15/42
 - .. Special clamping devices for workpieces to be riveted together, e.g. operating through the rivet holes
- B21J 15/44
 - .. Rivet hole positioners
- B21J 15/46
 - .. Positioners for rivets for making tube joints
- B21J 15/48
 - .. Devices for caulking rivets
- B21J 15/50
 - .. Removing or cutting devices for rivets

- B21J 17/00**
Forge furnaces (furnaces for heat treatment [C21D 9/00](#); furnaces in general [F27](#))

- B21J 17/02
 - . electrically heated (electric heating elements [H05B](#))

- B21J 19/00**
Blacksmiths requisites not otherwise provided for

- B21J 19/02
 - . Hearths
 - Air supply arrangements specially adapted therefor
- B21J 19/025
 - .. {Tyre heaters }

- B21J 19/04
 - . Anvils
 - Associated items